AMENDMENTS TO THE CLAIMS

**Claim 1 (currently amended):** A method of interactively ~~determining values of design variables for~~ optimizing an engineering design, ~~the engineering design having a structure, design variables associated with the structure and metrics for evaluating the performance of the design,~~ the method comprising:

assigning ~~initial~~ a baseline set of design values to ~~the~~ a set of design variables for the engineering design;

~~conducting a simulation of the design to determine values of the metrics of the design based on the initial values of the design variables;~~

~~identifying metrics which a designer desires to improve;~~

conducting a sensitivity analysis ~~by varying each design variable in turn over a range of values for the design variable~~ on the engineering design to determine a set of performance factors, wherein each of the set of performance factors defines an effect on a set of metrics for the engineering design of variations ~~effects of changes~~ in a selected one of the set of design variables over a range of values while holding the set of design variables except for the selected one at the baseline set of design values; and ~~on the metrics;~~

~~selecting one or more design variables whose values are to be changed based on the results of the sensitivity analysis; and~~

manually changing ~~the value of the selected design variables~~ one or more of the baseline set of design values based on the ~~results of the sensitivity analysis~~ set of performance factors to generate an updated set of design values for the set of design variables.

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**Claim 2** **(currently amended):** The method of claim 1, further comprising:

conducting a simulation <u>of the engineering design</u> based on the ~~revised~~ <u>updated set of design</u> values to <u>determine an output set of values for the set of metrics; and</u>

<u>evaluating the output set of values to determine whether the updated set of design values allows the engineering design to satisfy a performance criterion</u> ~~confirm the values of the metrics of the design with revised values~~.

**Claim 3** **(currently amended):** The method of claim 2, further ~~comprising~~ comprising:

<u>manually changing one or more of the revised set of design values based on the set of effects if the output set of values does not allow the engineering design to satisfy the performance criterion, and if the set of performance factors is determined to remain accurate for the updated set of design values</u> ~~determining whether a stopping criterion is satisfied and if so terminating the method, otherwise further determining whether the results of the sensitivity analysis remain reliable and, if so, selecting further design variables whose values are to be changed based on the results of the sensitivity analysis and changing the values of the selected further design variables based on the results of the sensitivity analysis~~.

**Claim 4** **(currently amended):** The method of claim ~~3~~ <u>2</u>, further comprising: ~~determining whether~~

<u>applying</u> a structural change to the engineering design ~~is desired~~ <u>to generate an updated engineering design</u> if the

output set of values does not allow the engineering design to satisfy the performance criterion, and if the set of performance factors is determined to not remain accurate for the updated set of design values; and

performing, on the updated engineering design, the steps of assigning the baseline set of design values, conducting the sensitivity analysis, manually changing one or more of the baseline set of design values, performing the simulation, and evaluating the output set of values ~~further determination of the results of the sensitivity analysis is that they are no longer reliable and if so, changing the structure of the design and conducting a further iteration of the method by assigning initial values to the design variables, otherwise iterating the method by further conducting a sensitivity analysis~~.

**Claim 5 (currently amended):** The method of claim 1, wherein conducting ~~a~~ the sensitivity analysis ~~by varying each design variable in turn over a range of values for the design variable to determine effects of changes in design variables on the metrics~~ comprises visually presenting ~~results~~ the set of performance factors to a designer for review.

**Claim 6 (currently amended):** The method of claim 1, wherein ~~the step of~~ conducting ~~a~~ the sensitivity analysis comprises: ~~by varying each design variable in turn over a range of values comprises varying each design variable over a subset of the range of values of the design variable~~

selecting one or more of the design variables;
selecting a simulation range for each of the one or more design variables;

selecting a test one of the one or more design
variables;

performing a set of simulations on the engineering
design using the baseline set of design values and varying
the test one of the one or more design variables over the
simulation range for the test one to generate a test set of
values for the set of metrics;

generating a set of test results for the test one of
the one or more design variables by associating the test
set of values with the simulation range for the test one of
the one or more design variables;

repeating the steps of selecting the test one,
performing the set of simulations, and generating the set
of test results for each of the one or more design
variables; and

compiling the set of test results for each of the one
or more design variables into the set of performance
factors.


**Claims 7-8   (cancelled)**


**Claim 9   (currently amended):**   A system for ~~determining values~~
~~of design variables for~~ interactively optimizing an engineering
design, ~~the engineering design having a structure, design~~
~~variables associated with the structure and metrics for~~
~~evaluating the performance of the design,~~ the system comprising:

storage means for associating a baseline set of design
~~initial~~ values ~~with each~~ for a set of design variables for
the engineering design;

~~a simulator for determining values of the metrics of~~
~~the design based on the initial values of the design~~
~~variables;~~

computing means <u>for performing a sensitivity analysis</u> <u>on the engineering design</u> ~~varying each design variable in~~ ~~turn over a range of values for the design variable~~ to determine <u>a set of performance factors, wherein each of the</u> <u>set of performance factors defines an effect on metrics for</u> <u>the engineering design of variations in a selected one of</u> <u>the set of design variables over a range of values while</u> <u>holding the set of design variables except for the selected</u> <u>one at the baseline set of design values;</u> ~~effects of~~ ~~changes in design variables on the metrics;~~

display means for visually displaying the <u>set of</u> <u>performance factors</u> ~~results of design variable variation on~~ ~~metrics~~; and

means for <u>allowing a user to select and change</u> ~~selecting and changing the values of~~ one or more <u>of the</u> <u>baseline set of</u> design ~~variables~~ <u>values</u> based on the <u>set of</u> <u>performance factors</u> ~~results of varying each design~~ ~~variable~~.

**Claim 10 (new):** The system of Claim 9, further comprising means for allowing the user to apply a structural change to the engineering design.

**Claim 11 (new):** A software tool for controlling a computing system, the software tool comprising:

instructions for causing the computing system to store a baseline set of design values for a set of design variables for an engineering design;

instructions for causing the computing system to perform a sensitivity analysis on the engineering design to determine a set of performance factors, wherein each of the set of performance factors defines an effect on a set of

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metrics for the engineering design of variations in a
selected one of the set of design variables over a range of
values while holding the set of design variables except for
the selected one at the baseline set of design values;

instructions for causing the computing system to
graphically display the set of performance factors for a
user; and

instructions for causing the computing system to
adjust one or more of the baseline set of design values to
generate an updated set of design values for the set of
design variables in response to an input from the user.

**Claim 12   (new):**   The software tool of Claim 11, further
comprising instructions for causing the computing system to
perform a simulation of the engineering design using the updated
set of design values to determine an output set of values for
the set of metrics.

**Claim 13   (new):**   The software tool of Claim 12, further
comprising instructions for applying a structural change to the
engineering design.

**Claim 14   (new):**   The software tool of Claim 11, wherein the
instructions for causing the computing system to perform the
sensitivity analysis comprise:

selection instructions for causing the computing
system to select a test one from a set of one or more of
the design variables;

simulation instructions for causing the computing
system to perform a set of simulations on the engineering
design using the baseline set of design values and varying
the test one of the one or more design variables over a

simulation range for the test one to generate a test set of values for the set of metrics;

result generation instructions for causing the computing system to generate a set of test results for the test one of the one or more design variables by associating the test set of values with the simulation range for the test one of the one or more design variables;

looping instructions for causing the computing system to repeatedly execute the selection instructions, the simulation instructions, and the result generation instructions to generate the set of test results for each of the set of one or more of the design variables; and

compilation instructions for causing the computing system to compile the set of test results for each of the set of one or more of the design variables into the set of performance factors.